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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/746,823	12/22/2000	Erik Bengtsson	8194-453IP	8910
20792	7590	12/28/2005	EXAMINER	
MYERS BIGEL SIBLEY & SAJOVEC			TRAN, KHANH C	
PO BOX 37428			ART UNIT	
RALEIGH, NC 27627			PAPER NUMBER	
			2631	
DATE MAILED: 12/28/2005				

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/746,823	Applicant(s) BENGTTSSON ET AL.	
	Examiner Khanh Tran	Art Unit 2631	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 September 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-10,12-20,22-28 and 30-38 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 10,12-19,28 and 30-36 is/are allowed.
- 6) ☒ Claim(s) 1,3-9,20,22-27,37 and 38 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 December 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. The Amendment filed on 09/27/2005 has been entered. Claims 1, 3-10, 12-20, 22-28 and 30-38 are pending in this Office action.

Response to Arguments

2. Applicant's arguments filed on 09/27/2005, with respect to the rejection of claims 1, 3-9, 20, 22-27 and 37-38, have been fully considered but they are not persuasive. See explanation below.

3. Applicant's arguments, see pages 12-18, filed on 09/27/2005, with respect to claims 10, 12-19, 28, 30-36 have been fully considered and are persuasive. The rejection of claims 10, 12-19, 28, 30-36 has been withdrawn.

4. The Affidavit 37 C.F.R. 1.131 filed on 09/27/2005 has been considered and entered.

5. On pages 12-16 in the Amendment, Applicants argue that the cited reference, either alone or in combination, did not disclose or suggest a modulation system that includes both "a modulator that modulates the in-phase and quadrature-phase signals and "an amplifier having a signal input, an amplitude control input and an output"

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The Examiner responds that Perrett et al. U.S. Patent 6,018,275 does teach the claimed limitation as discussed in claim 1 rejection below.

- On pages 16-18, Applicants argue that Cordoba does not qualify as prior art to the claimed application and provides an Affidavit 37 C.F.R. 1.131 to support the assertion.

The Examiner has withdrawn previous rejection of claims 10, 12-19, 28, 30-36 in view of Cordoba US 6,671,337 B1.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1, 3-6, 8-9, 20, 22-27 and 37-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Perrett et al. U.S. Patent 6,018,275 in view of Gailus et al. U.S. Patent 6,449,465 B1.

Regarding claim 1, ***in column 10 lines 1-31***, Perrett et al. teaches an embodiment in which a radio transmitter includes a phase locked loop (PLL) 30, which is similar to the PLL in figures 3 and 4. In column 4 lines 5-15, the PLL 30 (shown in figure 4) includes a voltage controlled oscillator 34, which has a controlled oscillator input and a controlled oscillator output. Referring to figure 4,

the feedback loop comprises a mixer 35 responsive to a frequency source 37 that corresponds to the claimed local oscillator, a main frequency divider 35, and a modulator 39 ***coupled to the feedback path for modulating the baseband signal onto the signal*** having a downconverted frequency of substantially the reference frequency.

Perrett et al. does not expressly teach the modulator modulates the in-phase and quadrature-phase signals.

However, in column 7 lines 40-50, because Perrett et al. suggests that the modulator 39 can be a ***conventional IQ modulator***, therefore, it would have been obvious for one of ordinary skill in the art at the time the invention was made that the modulator 39 can be modified to modulate the in-phase and quadrature-phase signals as claimed.

In column 10 lines 20-30, the transmitter comprises a power amplifier coupled to the output of the PLL for amplifying the signal to be transmitted. The transmitter further comprises means for decomposing the baseband signal into a complex signal having polar coordinates, and for forwarding the amplitude part to the power amplifier and the phase part to the modulator, wherein the power amplifier is a variable amplifier, which is responsive to the amplitude part of the baseband signal. The variable amplifier is embodied as amplifier 72 shown in figure 7.

Perrett et al. does not teach a digital signal processor (DSP) that generates in-phase, quadrature-phase and amplitude signals from a baseband signal as claimed.

Gailus et al. teaches a method and apparatus for linear amplification of a radio frequency signal. Referring to figure 4, Gailus et al. teaches a linear transmitter 306 including a DSP 401, which functions as an information source to generate a digital baseband input signal. The digital baseband input signal, preferably a quadrature modulation information signal, includes an in-phase (I) component 404 and a quadrature (Q) component 403.

Perett et al. invention differs from Gailus et al. invention in that Perett et al. does not teach a DSP that generates in-phase, quadrature-phase and amplitude signals from a baseband signal. Nevertheless, as taught in Gailus et al. invention, DSP 401, which functions as an information source to generate a digital baseband input signal including an in-phase (I) component 404 and a quadrature (Q) component 403. In light of that, it would have been obvious for one of ordinary skill in the art at the time the invention was made that Perett et al. transmitter can be modified to utilize the DSP as taught Gailus et al. for generating the in-phase (I) component and a quadrature (Q) component. The motivation is that Perett et al. employs a conventional IQ modulator to modulate a complex signal and DSP as taught Gailus et al. could function as an information source to generate in-phase (I) component and a quadrature (Q) component.

Regarding claim 3, in column 7 lines 30-46 of Perrett et al. invention, the baseband signal f_{bb} is decomposed into a complex signal of the form $R \angle \theta$ which represents the in-phase and quadrature-phase component signals. As appreciated by one of ordinary skill in the art, the magnitude part is the normalized amplitude signal. And because the baseband signal f_{bb} can be decomposed into a complex signal, the baseband signal f_{bb} includes normalized in-phase and quadrature-phase component signals. Because the baseband signal f_{bb} includes normalized in-phase and quadrature-phase component signals, the modulated signal has a constant amplitude modulated signal.

Regarding claim 4, as recited in claim 3, the baseband signal f_{bb} can be decomposed into a complex signal including the magnitude part of the signal, f_{bb} , and the phase part of the signal, f_{bb} . In light of that, the magnitude part of the signal, f_{bb} , and the phase part of the signal, f_{bb} are the normalized in-phase signal as one of a cosine and a sine of an angle θ , and the normalized quadrature-phase signal as the other of a cosine and a sine of an angle θ , where θ is angle whose tangent is the quadrature-phase signal divided by the in-phase signal, as claimed in the application claim.

Regarding claim 5, the magnitude part of the signal, f_{bb} , is inherently calculated as a square root of a sum of the in-phase signal squared and the quadrature-phase signal squared as claimed in the application claim.

Regarding claim 6, referring to figure 7 of Perrett et al. invention, in column 7 lines 30-46, the magnitude part of the signal, f_{bb} , is applied to the variable power amplifier 72 to vary the amplitude of amplifier output. In view of that, the magnitude part of the signal, f_{bb} , corresponds to the claimed power control signal, wherein the amplitude control input of the power amplifier is responsive to the magnitude part of the signal, f_{bb} .

Regarding claim 8, referring to figure 4 of Perrett et al. invention, a transmit antenna is responsive to output of the PA 32 as claimed in the application claim.

Perrett et al. does not expressly teach a user interface that generates the baseband signal in response to user input. Because the baseband signal f_{bb} is generated and provided to the modulator 39, it would have been obvious for one of ordinary skill in the art at the time the invention was made that an user interface is employed to generate the baseband signal in response to user input. The motivation for using a user interface is that the baseband signal f_{bb} is generated and provided to the modulator 39 by an information source in the form of a user input.

Regarding claim 9, referring to figure 4 of Perrett et al. invention, the PA 32 is a power amplifier.

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Regarding claim 20, claim 1 discloses a modulation system including elements performing steps in claim 20. In view of that, claim 20 is rejected on the same ground as for claim 1 because of similar scope.

Regarding claim 22, claim 22 is rejected on the same ground as for claim 3 because of similar scope.

Regarding claim 23, claim 23 is rejected on the same ground as for claim 4 because of similar scope.

Regarding claim 24, claim 24 is rejected on the same ground as for claim 5 because of similar scope.

Regarding claim 25, claim 25 is rejected on the same ground as for claim 6 because of similar scope.

Regarding claim 26, claim 26 is rejected on the same ground as for claim 7 because of similar scope.

Regarding claim 27, claim 27 is rejected on the same ground as for claim 8 because of similar scope.

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Regarding claim 37, claim 37 is rejected on the same ground as for claim 1 because of similar scope.

Regarding claim 38, claim 38 is rejected on the same ground as for claim 1 because of similar scope.

7. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Perrett et al. U.S. Patent 6,018,275 and Gailus et al. U.S. Patent 6,449,465 B1 as applied to claim 1 above, and further in view of admitted prior art of figure 3 of the original disclosure.

Regarding claim 7, Perrett et al. does not teach another power amplifier as set forth in the claim. Admitted prior art of figure 3 in the original disclosure shows a power amplifier 226 connected to an antenna 232, the power amplifier 226 being after a variable gain amplifier. In view of that, it would have been obvious for one of ordinary skill in the art at the time the invention was made that Perrett et al. transmitter in figure 4 can be modified to include a power amplifier such as disclosed in admitted prior art. The motivation is that as known in the art, power amplifier is employed to amplify the modulated signal before transmission.

Allowable Subject Matter

8. Claims 10, 12 and 16-19 are allowed.

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The following is a statement of reasons for the indication of allowable subject matter:

Regarding claim 10, claim is allowable over cited prior art because the cited references, taken individually or in combination, fail to disclose the unique distinct features "an amplitude tracking subsystem that is **responsive to the quadrature modulator** to produce an amplitude signal that is responsive to amplitude changes in the modulated signal and that is independent of phase changes in the modulated signal.

9. Claim 13 is allowed.

The following is a statement of reasons for the indication of allowable subject matter:

Regarding claim 13, claim is allowable over cited prior art because the cited references, taken individually or in combination, fail to disclose the unique distinct features "an amplitude tracking subsystem that is **responsive to the quadrature modulator** to produce an amplitude signal that is responsive to amplitude changes in the modulated signal and that is independent of phase changes in the modulated signal ..." and "wherein the automatic gain control subsystem further comprises: a first envelope detector that is responsive to the phase locked loop; a second envelope detector that is responsive to the amplifier; and a comparator that is responsive to the first and second envelope detectors to produce the amplitude signal".

10. Claim 14 is allowed.

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The following is a statement of reasons for the indication of allowable subject matter:

Regarding claim 14, claim is allowable over cited prior art because the cited references, taken individually or in combination, fail to disclose the unique distinct features "*an amplitude tracking subsystem that is responsive to the quadrature modulator to produce an amplitude signal that is responsive to amplitude changes in the modulated signal and that is independent of phase changes in the modulated signal ...*" and "*wherein the automatic gain control subsystem further comprises: a first envelope detector that is responsive to the phase locked loop; a second envelope detector that is responsive to the amplifier; and a comparator that is responsive to the first and second envelope detectors to produce the amplitude signal*".

11. Claim 15 is allowed.

The following is a statement of reasons for the indication of allowable subject matter:

Regarding claim 15, claim is allowable over cited prior art because the cited references, taken individually or in combination, fail to disclose the unique distinct features "*an amplitude tracking subsystem that is responsive to the quadrature modulator to produce an amplitude signal that is responsive to amplitude changes in the modulated signal and that is independent of phase changes in the modulated signal*" and "*wherein the amplitude tracking subsystem further comprises: an envelope detector that is responsive to the modulated signal to produce the amplitude signal*".

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12. Claims 28, 30 and 34-36 are allowed.

The following is a statement of reasons for the indication of allowable subject matter:

Regarding claim 28, claim is allowable over cited prior art because the cited references, taken individually or in combination, fail to disclose the unique distinct features "producing an amplitude signal from the modulated signal that is responsive to amplitude changes in the modulated signal and that is independent of phase changes in the modulated signal".

13. Claim 31 is allowed.

The following is a statement of reasons for the indication of allowable subject matter:

Regarding claim 31, claim is allowable over cited prior art because the cited references, taken individually or in combination, fail to disclose the unique distinct features "producing an amplitude signal from the modulated signal that is responsive to amplitude changes in the modulated signal and that is independent of phase changes in the modulated signal" and "wherein the producing an amplitude signal from the modulated signal comprises automatic gain controlling the modulated signal to produce the amplitude signal; and wherein the automatic gain controlling comprises: envelope detecting the modulated signal; envelope detecting a signal in the phase locked loop; and comparing the envelope detected modulated signal and the envelope detected signal in the phase locked loop to produce the amplitude signal".

14. Claim 32 is allowed.

The following is a statement of reasons for the indication of allowable subject matter:

Regarding claim 32, claim is allowable over cited prior art because the cited references, taken individually or in combination, fail to disclose the unique distinct features "producing an amplitude signal from the modulated signal that is responsive to amplitude changes in the modulated signal and that is independent of phase changes in the modulated signal" and "wherein the producing an amplitude signal from the modulated signal comprises automatic gain controlling the modulated signal to produce the amplitude signal; and wherein the automatic gain controlling comprises: envelope detecting the modulated signal; envelope detecting the amplified phase signal; and comparing the envelope detected modulated signal and the envelope detected signal in the phase locked loop to produce the amplitude signal".

15. Claim 33 is allowed.

The following is a statement of reasons for the indication of allowable subject matter:

Regarding claim 33, claim is allowable over cited prior art because the cited references, taken individually or in combination, fail to disclose the unique distinct features "producing an amplitude signal from the modulated signal that is responsive to amplitude changes in the modulated signal and that is independent of phase changes in the modulated signal" and "wherein the producing an amplitude signal from the

modulated signal comprises envelope detecting the modulated signal to produce the amplitude signal".

Conclusion

16. THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Khanh Tran whose telephone number is 571-272-3007. The examiner can normally be reached on Monday - Friday from 08:00 AM - 05:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad Ghayour can be reached on 571-272-3021. The fax phone

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number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

KCT

Khanh Cong Tran

12/23/2005

Examiner KHANH TRAN